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Bernard L. Greenberg
Director of Admissions and Records, Gallaudet College

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BERNARD L. GREENBERG

Until rather recently the admissions process in most colleges in the United States consisted essentially of recruiting the best possible group of applicants and granting admission to a sufficient number of the best of these to meet the goals of the institution. "Best" has been variously defined—sometimes it incorporates notions of well-roundedness; frequently it embraces excellence in athletic activities; but most often it boils down to predicting who will get the best grades in college.

But now, however, a new concept has entered the admissions picture—a criterion of social necessity which states "If there is in society a group who for one reason or another are substantially less well prepared for college work than the norm and are therefore largely excluded from attending college, it is in the best interests of society to make special provision for giving them access to higher education." This new criterion has left many admissions officers bereft of methodology. Only an over-courted handful of the various deprived minorities comes within shooting distance of the old standards. It is evident that a different approach is needed.

And it is here that Gallaudet College has something to offer. Gallaudet is an accredited liberal arts college for the hearing handicapped, founded more than a century ago. To the layman whose only contact with deafness has been through some octogenarian ancestor, the educational problems of the early onset deaf may seem far removed from the problems of the economically deprived. But closer examination reveals some fundamental identities, grounded in a common isolation from the mainstream of our Western culture.

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Bernard L. Greenberg is Director of Admissions and Records, Gallaudet College.

To begin with, even before he goes to school, the deaf child's experience of the world is circumscribed. He does not hear nursery rhymes; he is not read fairy tales. No matter what the socio-economic status of his family, he is in much the same position as the ghetto or Chicano child whose parents are often virtually illiterate and in any event are too preoccupied trying to ward off starvation to indulge in such middle class frills as ABC books and bedtime stories. The deaf child, then, like other deprived children, starts his education with a built-in cultural deficit as well as a language problem. At school the process accelerates. Assuming equal teaching and innate intellect, learning rate is a function of previously accumulated knowledges and skills. A child who is achieving at 95 percent of the average in kindergarten brings a little less to first grade than the norm. By the end of first grade he has acquired probably only some 90 percent of the skills and knowledges typically gained in first grade. And so on *cumulatively* through the years. This accounts for the well-documented fact that the performance of inner city children is close to average in first grade but is two, three and even more years behind the norm by senior high school. Exactly the same phenomenon is observable among the deaf. What starts out as a simple communications problem, year by year develops into a formidable deficit of knowledges and abilities, with an inadequacy of reading skills driving the whole sorry mechanism.

I could go on at length detailing the areas of similarity. Suffice it to say that cultural deprivation as an educational problem looks much the same no matter how it is caused. For this reason it seems likely that Gallaudet's experience may be of some use to others who are now also faced with the task of identifying students with college potential from among an undifferentiated group of poorly prepared candidates.

Our admissions process is based on several assumptions:

1) Since the deaf population is a virtually random selection from the American population, drawn from all parts of the country, from all racial and ethnic groups, from all socio-economic classes, and from both sexes, one must assume that the deaf population is normally distributed in regard to innate intellectual capacity, and that it, therefore, contains a substantial number of individuals who can profit from advanced education.

2) Ability to do college-level work successfully depends primarily on intellectual capacity and academic skills. Both intellect and skills must be present to a useful degree. In other words, even a genius-level intellect will fail if he is seriously lacking in skills.
3) The most essential academic skill is the ability to comprehend written material, with the ability to write comprehensibly following close behind. For students with scientific or technical aspirations mathematical skills are also crucial.
4) Deficits in knowledges are comparatively easy to repair; deficits in basic skills are much more difficult. Nevertheless, appropriate remedial work in skill areas can make it possible for submarginal students to handle a college curriculum. The limits of remedial programs have not been thoroughly tested; today the amount of remedial work offered in most colleges is contingent primarily on economics. At Gallaudet, for instance, we offer one year of pre-college work and occasionally two. Neither we nor anyone else knows whether total educational reconstruction of young adults is *possible*. At present it is not practicable.

As in other deprived populations, there are a certain number of deaf who for one reason or another have *not* been educationally blighted by their handicap. These can easily be singled out. They show up well on the traditional tests of academic potential and are beyond the scope of this paper.

The problem is not how to spot these obvious nuggets, but how to find the hidden veins of gold. The usual verbal college aptitude tests do not seem to predict well either grades or attrition for our population, and close analysis shows us why. Scores on such tests are pathetically low and the score differences one finds among individuals are largely attributable to chance and error variance rather than to real differences in ability. For example, when verbal SAT scores are ranked in comparison to scores on two highly predictive tests in our own battery, it takes an increase of about 75 SAT points to produce a reliable increase in ability on our tests, and even this increase of ability is extremely small. That is, if a can-

didate has a verbal score of 275, it is probable that he is slightly more able to handle college work than a candidate with a score of 200 and slightly less able than one with a score of 350. But it is impossible to demonstrate that he is at all superior to a student with a score of 225 or weaker than one with a score of 325. Furthermore, if verbal SAT scores are divided into 10-point groupings (a range amounting to a small fraction of a standard deviation on the SAT), the average dispersion of scores on the predictive Gallaudet tests in any one 10-point SAT range exceeds three standard deviations. *In other words, deaf students with virtually identical SAT verbal scores actually represent a wide range of ability.*

The Gallaudet admissions procedure is predicated on the assumption that ability will out. We believe that, though deprivation can, and usually does, wreak educational havoc, the individual with high innate capacity will, no matter what his handicaps—within reason, of course—show elevated ability in *some* area. *This argues not for abandoning testing as some have done but rather for an extensive evaluation battery covering as many different skill areas in as many different formats as practicable, to give the candidate maximum opportunity to demonstrate his abilities.* We look on our admissions screening as a talent hunt. Our interest is not in cataloguing weaknesses—God knows that's easy enough—but in ferreting out strengths, always bearing in mind that some minimum level of the essential academic skills must exist. We are in the business of screening *in* not screening out.

The battery we use today contains 20 different measures administered over a two-day period. Apart from timing, the tests are self-administering. The directions have been written simply with clear sample questions to avoid spuriously low scores resulting from misunderstood instructions, a not uncommon problem in disadvantaged populations. The scores on these 20 measures are later used diagnostically in planning remedial programs for accepted students but are evaluated in the following manner in making admission determinations. We group these measures, first, into broad skill areas. To the three mentioned above—reading, writing and math—we have added two others—vocabulary and grammar—which logically are subsidiary parts of reading and writing skills, but which have proved to have an independent predictive value warranting their being given coordinate status:

> *Reading:* We use two tests to assess this skill and derive from them three scores.

1. The first is the Cooperative Test of Reading Comprehension for senior high school, from which we obtain the usual Speed and Level scores. The content of this test is face valid for college work, although it has a rather heavy emphasis on literary-type passages rather than exposition. The chief problem we have with it is that it is rather highly speeded—deaf students typically work more slowly on written tests than average. It is possible that all deprived groups are better measured by tests with a low speed component. In any case this view is taken by the Commission on Tests of the CEEB. The excessive speed element seems to reduce reliability and thus dilutes predictive validity. We are now experimenting with much increased time allowances. It may make some sense when dealing with fine readers to distinguish between those who read rapidly and those who read more slowly, but when the students are poor readers the speed dimension becomes meaningless.
2. The second reading test we employ is one prepared for our own use, though we have developed some general high school norms for it. It consists of 16 expository selections drawn directly from college textbooks, but slightly edited to make the test more independent of vocabulary level. The selections are drawn equally from the sciences, the humanities and the social sciences, and thus constitute what is tantamount to a work-sample test for a liberal arts curriculum.

Writing: For this skill grouping, we define writing narrowly as the ability to take ideas and put them into effective sentences. Other facets of writing skill are included in the battery, but we do not consider them in this grouping. To measure this skill we use a single test of unique format, prepared for Gaallaudet. It has 10 questions, each consisting of three simple sentences or ideas; the student is required to write a single correct sentence incorporating all three ideas. A variety of relationships are included: cause and effect, alternatives, description and temporal sequence, among others. Scoring keys have been prepared which

permit these free-answer questions to be scored quickly and with almost complete objectivity. Despite the shortness of the test and its free-answer nature, it has consistently been found to be as reliable and stable as much longer, wholly objective tests. Its reliability coefficients are typically in the .85 to .95 range. Of the 20 measures used, this test consistently is among the best two or three in predicting four-year grade-point average.

Grammar: We define this skill as grammatical usage, not mechanics, though we do measure the latter in the battery as well. We include two tests of usage, both prepared for Gallaudet.

(1) The first is a test of conventional grammar, including all the standard bugbears—faulty reference, dangling participles, agreement errors, unparallel construction and the like.

(2) The second test is more interesting—we refer to it as Deaf Mistakes. The deaf, like inner city residents, or the Pennsylvania Dutch, or Middle European immigrants, have characteristic locutions which do not conform to standard English language patterns. These are not grammatical errors in the same sense as those in the first test, but rather non-standard constructions. Because the locutions in this test are unique to the deaf, the test could not be used in its present form with any other group. The concept and format, however, could readily be adapted to measuring ghetto candidates' ability to recognize ghetto locutions which are not standard English usage.

Vocabulary: We regard this area as crucial since it underlies both of the fundamental skills of reading and writing, and, indeed, vocabulary tests are consistently among the most predictive of college success for deaf students as well as for the hearing. We use four different measures, one a commercial test and the other three designed especially for our use.

The first is the 60-item vocabulary section of the Cooperative Reading Test. Each question presents a word and a number of suggestions from among which

the student is to find a synonym. Like the other portion of the Cooperative Reading Test, we find the vocabulary section too highly speeded for adequate reliability with our population.

Second, we use another test of standard vocabulary, but with a different format, more nearly akin to the way words are used in the writing than in the reading process. An idea is presented and the student is to select from among some alternatives a word that conveys the desired meaning.

The third vocabulary test is more unusual; it tests knowledge of standard English idioms. Although this area is rarely tested, weakness in it is an even more serious barrier to reading comprehension than paucity of vocabulary. *We* know what such expressions as "hard put to it" or "give rise to" mean, but the deprived student has not been exposed to such locutions as a matter of course and, unlike formal vocabulary, idioms are virtually never taught specifically. All writing is larded with such expressions, but there is no flag on the material to indicate that a particular group of simple words cannot be taken literally. Paragraph upon paragraph in this way becomes hopeless gibberish to many deprived students. The interrelationship of scores on idiom vocabulary and ordinary vocabulary shows that for the deaf at least, the two areas are by no means identical.

Fourth and finally, we use a test of inferential vocabulary. Observation of good readers suggests that they are skillful in *inferring* the meaning of unfamiliar words from the context in which they are found and that in this way they build their vocabulary. This test measures this inferential ability. Each question presents in a brief paragraph a vocabulary word so difficult that it can be assumed to be beyond the knowledge of all candidates. The task is to derive its meaning from the paragraph context. This, too, seems a measurably distinct verbal skill.

Mathematics: We use two tests in this skill area, both commercially available, because the deaf closely

resemble their normal counterparts in mathematical ability and do not seem to require specially prepared tests. We obtain from these tests three scores:

First, the Cooperative Algebra Test, 9th Grade Level. We use a test of elementary rather than advanced algebra because of the limited high school curriculum offerings available to the deaf.

Second, the California Mathematics Test, Advanced Level. From this the usual reasoning and fundamentals scores are derived.

Altogether then, these five basic skill areas—Reading, Writing, Grammar, Vocabulary and Math—account for 13 of the 20 measures used. The remaining seven measures, six tests and one rating, are used to indicate special strengths. These seven measures are:

1. The Cattell Culture Fair Non-Verbal Intelligence Test—This test has two drawbacks from the point of view of use in admissions. First, it does not measure the usual criteria of college success; apparently it is verbal intelligence which is called for in college and no amount of non-verbal intellect can compensate for verbal inadequacies. Second, the test is prone to false negatives—individuals score in the feeble minded range whose life histories clearly demonstrate this evaluation to be inaccurate. Accordingly, we pay attention only to high scores. These, we find, do predict ability to master mathematics, and may therefore, identify mathematics *potential* in individuals who have not been exposed to a mathematical curriculum.
2. A test of Concept Formulation—This instrument was originally prepared to test the often heard assertion that the deaf are unable to conceptualize—which incidentally proved a groundless stereotype—but since the test proved to have predictive validity somewhat independent of other measures, it was included in the admissions battery as well. It consists of 20 questions, in each of which are five words, four of which are similar in some underlying quality. The task is to choose the dissimilar word. The vocabulary level is kept low, to reduce contamination from

vocabulary knowledge and the words are arranged so as to encourage the formulation of incorrect concepts which must be tested and discarded. A premium is thus placed on mental agility. This test is the only one in the battery which is closely related to *both* verbal and mathematical ability.

3. Paragraph Arrangement—This test, also prepared for Gallaudet's use, is designed to measure a significant facet of writing skill—the ability to put thoughts in logical, coherent order. Curiously, the test correlates poorly with grades for the remedial year—and was nearly abandoned when we began to validate the battery using first year grades as a criterion—but it proved to be quite predictive of four-year college grades. The explanation appears to be that during the remedial programs addressed are the basic ones of word use and sentence structure. It is only later in the student's educational career that the importance of coherence is given proper recognition.

4. Punctuation—Though prepared for Gallaudet, this is a conventional test of punctuation and capitalization skills.

5. Spelling—Like the punctuation test, this is a traditional measure of ability to spell. We have arbitrarily excluded both of these tests from measurement under the basic Grammar skill, partly because of my judgment as a renegade English professor that such mechanics are of little importance in the art of writing. To my embarrassment, however, they appear to be quite predictive of success in college.

6. Cooperative Science Test, Junior High School Level.—This test is included in our battery because most of our applicants have taken very little science. If they, nevertheless, have a high level of knowledge about it, it might be reasonably inferred that they have a special interest in the area.

7. Rating of Motivation—This is a simple combination of graphic ratings on several aspects of motivation, furnished by the applicant's secondary school. This rating is among our most predictive measures and has

the added advantage of predicting most effectively in the mid-range area, where ability differences are extremely difficult to distinguish, but where there is a great range in degree of success in college. The ability of the motivation rating to predict college performance is largely independent of cognitive measures, and thus adds greatly to accuracy of prediction.

Since none of these twenty measures overlaps more than 50 percent with any other in the battery, it is probable that each is contributing at least a little something unique to our knowledge about candidates. With a few exceptions each of the measures is significantly related to four-year grade-point average and to remaining in college till graduation.

How do we set about digesting this large and heterogeneous mass of information in order to make admissions decisions? Essentially, we categorize the applicant population into six broad groups, according to their rested competence in the five major skill areas:

Group I consists of applicants who are superior in all five skills. This is the group who have not been seriously disadvantaged by their handicap.

Group II consists of those who are superior in four of the five skills. These are usually representatives of that familiar class of very able individuals who are undone by mathematics.

Group III is defined as those applicants who do not meet the criteria for the first two groups but who have at least a moderate level of skill in all five basic areas. We define this minimum level pragmatically in terms of what our many years of experience tell us can be accomplished in a year of remedial work. Beyond this minimum competence requirement, moreover, for inclusion in Group III we require that the applicant show several areas of distinct strength.

Group IV is made up of applicants who meet this moderate skill level on three or four of the basic areas and who, in addition, show strength on a number of tests. The entire record of these applicants is scrutinized minutely, with special emphasis on motivation.

Group V consists of applicants who meet none of the above standards but who show some other sign of potential, for example, very elevated intelligence or science scores, extremely favorable recommendations, or scores in the five primary skill areas which approach those needed for inclusion in Group III. The entire record of those in Group V, too, is reviewed with great care, again with emphasis on motivation. Group VI are those who are performing at an extremely low level and who have been unable to muster any evidence that they have the potential to handle a college curriculum in the reasonably near future.

All candidates are viewed for suitability—age, character, health and the like—before being granted admission.

Admission is generally offered to all members of Groups I, II, and III, who are otherwise suitable. About two-third of Group IV are admitted and about one-third of Group V. Those in Group VI are not offered admission. In all, about half of the applicant group are admitted each year. Except for Groups I and II, all those admitted—about 80 percent of the total—are required to take a year of remedial work before entering the college proper.

Bringing professional judgment to bear on each candidate's credentials may be more time consuming than a simple cutting point approach (though our computer is programmed to do the initial categorization of applicants into the six basic groups), but it is less wasteful of student potential. It appears to be highly valid:

Those in Group I have three chances out of four of graduating and two chances out of three of earning at least a B average.

Those in Group II graduate in two out of three cases and have an even chance of earning a B average or better.

Those in Group III have a 50-50 chance of graduating and have one chance in three of a B average.

In Group IV only one of three who are accepted graduates and only 1 in 10 earns a B average.

Those accepted from Group V have one chance in four of graduating and virtually no chance of earning a B average.

It is clear from this progression that those in Group VI would have very little possibility of success if they were granted admission.

I should perhaps point out that the reason we accept applicants

from the high risk Groups IV and V, where the prediction would be one of failure, is that the deaf have extremely limited alternatives for higher education—Gallaudet is the only liberal arts institution in the world to serve their needs. Accordingly, we feel an obligation to give an opportunity to anyone who has a fighting chance of succeeding.

As I have mentioned, Gallaudet requires 80 percent of each incoming class to take a year of remedial work before attempting the college curriculum. These students are placed in classes of 15 or fewer in accordance with their general level of language ability and their specific deficiencies as diagnosed by the admissions tests. General verbal level is determined by a weighted combination of all verbal tests in the admissions battery. The weights used were derived, not from the textbook regression equation, but judgmentally, taking into account differences in standard deviations. We tried both judgmental and regression weighting and found the judgmental method less subject to shrinkage from class to class than the regression weights. After general verbal level has been determined, the student may be placed in a group whose members are all especially deficient in formal grammar, or in vocabulary knowledge, or in reading comprehension and so on. Course content is tailored for the general ability level of the group with emphasis on the areas of most severe deficit. Remedial mathematics, as we practice it, is more traditional with classes in the usual subject matter areas.

At the end of this preparatory year, students are retested. Whether or not they are admitted to the college proper depends primarily on their instructors' evaluations of their work and on what measurable improvement they have made on the tests. Since most of the students taking the remedial program were several years behind normal high school graduate achievement to begin with, we cannot expect them to make up the entire deficit in a single year. Thus, most of them enter their Freshman year still with weaker skills than the normal college student. But they are on the upswing. With good instruction and continued motivation, they move nearer and nearer to closing the gap, and a not inconsiderable number even become honor students.

In summary, then, at Gallaudet we believe, not in less testing of educationally retarded applicants, but in more. Simply because some traditional measuring devices are too insensitive to record

differences occurring among a group of poorly equipped students is no reason to give up the effort to detect these differences, if they are significant to performance—and they are.

We have a multi-dimensional admissions battery which has proven capable of determining with a high degree of accuracy which students from a disadvantaged population can, with a reasonable remedial investment, do college-level work successfully. Scores on the admissions tests can also be used diagnostically to tailor remedial work to individual needs.

We believe than an adaptation of our approach would enable other institutions to enroll disadvantaged students with considerably more hope of success than many colleges have at present. Even in situations where it is impractical or impolitic to use admissions tests, the multi-dimensioned battery approach used for placement in an individually designed remedial program can substantially improve a student's chances of graduating.

For a more detailed and technical treatment of this subject, see the June 1971 issue of the American Annals of the Deaf.